Watermaster Service Policy #1
Water Distribution Methodology

Unless directed otherwise by the court or as directed otherwise by a specific clause in a decree, the following methodology will be used for determining the available, divertable water supply and the distribution of that water. The following methodology is also compatible with and applicable to water rights described as being "equal in priority and correlative in right".

The term "equal in priority" means that the referenced water rights are of the same priority as to their claim or right to the available water supply. No individual right is superior to any other right in that same priority class. When the available water supply is not sufficient to fill all the rights of a priority class, the supply is prorated to each user according to the proportion of the individual right to the sum of the rights in that priority class.

Term "correlative in right" means that the referenced water rights mutually relate to each other independent of other factors such as proximity of location or position on the stream system. Two water rights which are equal in priority and correlative in right may be miles apart on a stream system, but they must be served at their designated points of diversion as though they were located at the same point of diversion.

<u>Water Distribution Methodology</u>

The available divertable water supply for a stream system is the summation of the amounts of flow diverted from the system plus the amount of any flow passing the last point of diversion. A common phrase for this methodology is "sum of the boxes." The sum of the boxes is the most efficient method of accounting for the water available for diversion in natural stream systems where accretions and depletions occur. Accretions are due to inflow from tributaries and springs, return flow from irrigation, subsurface flow surfacing, or high groundwater tables. Depletions or channels losses are due to groundwater recharge, channel storage, evaporation, and evapotranspiration.

Once the available divertable water supply is determined by summing of the boxes, then water is redistributed according the schedule of priorities as set by the specific decree for the stream system. This redistribution includes prorating within priority classes when there is not sufficient flow to fill a priority classe.

The Principle of Reasonableness, which stems from Article X, Section 2 of the California Constitution, must be applied. If a water allocation cannot reach its legal place of use or cannot be applied to a beneficial use, then it is not appropriate to distribute it in such a manner. In these situations the water allocation that would have not been applied to a beneficial use is prorated out to the other water right holders using the methodology explained above.

Sample Application of the Water Distribution Methodology

Figure 1 depicts a typical stream system for which the Department of Water Resources (DWR) provides watermaster service. In this example, there are six (6) right holders on the creek system (A, B, C, D, E, and F) shown on Figure 1 and listed in Schedule 1 that have decreed rights with equal priority.

There are two basic principles involved in the distribution of water using this methodology. The first principle is that all right holders of equal priority share in the total losses of the system. In other words, an upstream diverter shares in the losses between the upstream point of diversion (POD) and the other downstream diverters' PODs.

The second principle is that of reasonableness which stems from Article X, Section 2 of the California Constitution. This principle allows flows, that would normally be bypassed below an upstream diversion for use by downstream right holders, to be diverted to an upstream water right holder, if the bypassed flows would be lost due to channel losses before a reasonable, beneficial use could be made by the downstream water right holders.

The typical method of providing watermaster service is to measure the diversion of each right holder at the head or top end of the diversion conduit supplying each right holder (i.e., ditch, pipe, flume, etc.) using a measuring device or "box" as well as the flow in the creek, if any, immediately below the last diverter on the schedule. Referring to Figure 1, the total available flow for distribution, Z, would be:

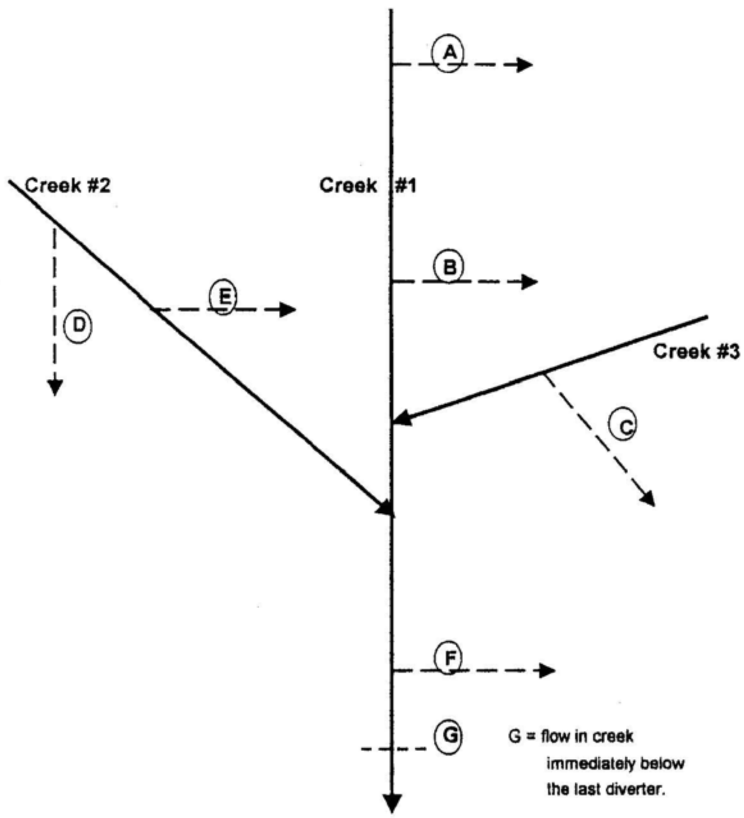
$$Z = A + B + C + D + E + F + G = \text{"sum of the boxes"}$$

The following scenarios demonstrate the principles of this water distribution methodology:

Scenario #1 – There is sufficient flow for all right holders ($Z \geq 5.90$ cfs).

Allocation Method: All right holders receive their full allocations of water.

Figure 1 - Water Distribution Methodology



Schedule 1 - Any Creek System

Right	Maximum Diversion (cfs)	% of total
A	0.65	11.0%
B	0.95	16.1%
C	0.80	13.6%
D	1.10	18.6%
E	0.40	6.8%
F	2.00	33.9%
Total =	5.90	100.0%

Available Flow to Allocate = Z*

Z = A + B + C + D + E + F + G

If Z < 5.90, then the allowable diversion at each location, Q_n, will be:
Q_n = (Z/5.90) x (maximum diversion)

* If the allocated diversion is insufficient to reach a diverter, that diverter is not entitled to any of the flow and the available flow will be distributed amongst those diverters who can beneficially use this flow.

Scenario #2 – Available flows are insufficient to fully supply all diverters ($Z < 5.90$ cfs), but there is sufficient flow in all creeks to reach the furthest most downstream right holder.

Allocation Method: If Z is less than the total of the rights (or 5.90 cfs in this example), the allowable diversion, Q_n, at each location would be:

$$Q_n = (\text{Maximum Diversion}^1) \times (Z / 5.90)$$

[1] from Schedule 1

Scenario #3 – Available flows are insufficient to fully satisfy all rights ($Z < 5.90$ cfs) AND the flow in Creek #2 is so low that channel losses in Creek #2 would fully consume any allocation to right holder F, or make that allocation so low as to be of no benefit.

Allocation Method: Creek #2 would be treated as being independent of remainder of the Creek System. The total flow in Creek #2 would be split proportionately between right holders D and E based on their maximum diversion amounts and the remaining right holders (A, B, C, and F) would share proportionately the total flow in Creeks #1 and #3 based on their maximum diversion amounts.

If D + E = 0.25 cfs, then:

$Q_D = (0.25) \times (1.10/(1.10+0.40)) = 0.18$ cfs

$Q_E = (0.25) \times (0.40/(1.10+0.40)) = 0.07$ cfs

And if A + B + C + F = 2.00 cfs, then:

$Q_A = (2.00) \times (0.65/(0.65+0.95+0.80+2.00)) = 0.30$ cfs

$Q_B = (2.00) \times (0.95/(0.65+0.95+0.80+2.00)) = 0.43$ cfs

$Q_C = (2.00) \times (0.80/(0.65+0.95+0.80+2.00)) = 0.36$ cfs

$Q_F = (2.00) \times (2.00/(0.65+0.95+0.80+2.00)) = 0.91$ cfs